

CLAIMS

1. A cabinet for housing a vertical array of heat-producing units, the cabinet having an equipment chamber adapted to support the array such that the array cooperates with the cabinet in use to define a first plenum, the first plenum having an inlet for receiving a flow of cooling fluid and an outlet defined by a plurality of openings through the array whereby the first plenum communicates with the openings in use to exhaust substantially all of the flow of cooling fluid through the openings and hence through the array, wherein the inlet to the first plenum admits fluid to the first plenum in a substantially horizontal direction.
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2. The cabinet of Claim 1, wherein fluid crosses the first plenum in use as a horizontally-moving curtain of fluid.
- 15 3. The cabinet of Claim 2, wherein the flow of fluid is substantially uniform from top to bottom across the array.
4. The cabinet of any preceding Claim, wherein the inlet to the first plenum is a substantially vertical slot beside the first plenum.
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5. The cabinet of any preceding Claim, wherein the inlet to the first plenum extends substantially the full vertical extent of the array or of the plenum.
- 25 6. The cabinet of any preceding Claim, wherein fluid passing through the array is recirculated for intake to the first plenum.
7. The cabinet of Claim 6, and having a second plenum for receiving the flow of fluid once that flow has passed through the array, the second plenum having an inlet defined by a second plurality of openings through the array, and an outlet.
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8. The cabinet of Claim 7, wherein the outlet from the second plenum leads the fluid to a plant for cooling and impelling the fluid.

9. The cabinet of Claim 8, wherein the plant includes at least one heat exchanger and at least one impeller.

10. The cabinet of Claim 9, wherein the heat exchanger is upstream of the impeller.

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11. The cabinet of Claim 9, wherein the heat exchanger is downstream of the impeller.

12. The cabinet of any of Claims 9 to 11, and having a single heat exchanger.

10 13. The cabinet of any of Claims 9 to 12, and having a plurality of impellers.

14. The cabinet of Claim 13, wherein the impellers are disposed in a substantially vertical array.

15 15. The cabinet of Claim 13 or Claim 14, wherein each impeller is associated with a non-return valve that closes in the event of failure of that impeller.

16. The cabinet of any of Claims 9 to 15, wherein at least the heat exchanger is a module replaceable in use of the cabinet.

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17. The cabinet of Claim 16, wherein the heat exchanger is mounted to the cabinet on runners supporting the heat exchanger when it is withdrawn from the cabinet.

25 18. The cabinet of Claim 16 or Claim 17, wherein the heat exchanger is coupled to coolant supply ducts by dry-break connectors.

19. The cabinet of any of Claims 8 to 18, wherein the plant further includes one or more filters for filtering the fluid before it returns to the first plenum.

30 20. The cabinet of any of Claims 8 to 19, wherein the plant is housed in a plant chamber beside the equipment chamber.

21. The cabinet of Claim 20, wherein fluid circulates in use between the plant chamber and the equipment chamber.

22. The cabinet of Claim 20 or Claim 21, wherein the general flow of fluid is substantially horizontal throughout said circulation.

5 23. The cabinet of any of Claims 20 to 22, wherein the flow of fluid through the equipment chamber is substantially parallel to and opposed to the flow of fluid through the plant chamber.

10 24. The cabinet of any of Claims 20 to 23, wherein the general flow of fluid emanating from the plant chamber undergoes a substantially orthogonal direction change to enter the first plenum.

15 25. The cabinet of any of Claims 20 to 24, wherein the general flow of fluid emanating from the second plenum undergoes a substantially orthogonal direction change to enter the plant chamber.

26. The cabinet of any of Claims 20 to 25, wherein at least one door affords access to the plant chamber independently of access to the equipment chamber.

20 27. The cabinet of Claim 26, wherein respective doors affording access to the plant chamber and the equipment chamber have independent locks capable of permitting access to one chamber but not both.

25 28. The cabinet of any preceding Claim, wherein the or each plenum extends substantially vertically between an upright wall of the cabinet and an upright face of the array, and wherein openings through the array are distributed across the face of the array.

29. The cabinet of Claim 28, wherein the upright wall is a door or removable panel affording access to the cabinet.

30 30. The cabinet of Claim 28 or Claim 29, wherein the openings through the array extend substantially horizontally.

31. The cabinet of any of Claims 28 to 30, wherein first and second plenums are opposed about the array.
32. The cabinet of any preceding Claim, and being adapted to house units in the form of servers.
33. The cabinet of Claim 32, also housing or being adapted to house power supply and/or fire suppressant units.
- 10 34. The cabinet of any preceding Claim, further including heat transfer means for carrying heat away from the cabinet.
35. A method of cooling an array of heat-producing units housed in a cabinet, comprising directing a flow of cooling fluid into a plenum that communicates with 15 openings in the array and confining the flow such that substantially all of the flow passes from the plenum through the openings, wherein the fluid enters the plenum substantially horizontally.
36. The method of Claim 35, comprising directing the flow across the plenum.
- 20 37. The method of Claim 35 or Claim 36, comprising apportioning the flow substantially equally among the openings.
38. The method of any of Claims 35 to 37, wherein the flow into the openings is 25 transverse to the direction of flow through the plenum.
39. The method of Claim 38, wherein the direction of flow through the plenum and the flow through the openings is generally horizontal.
- 30 40. The method of any of Claims 35 to 39, wherein fluid flows across the first plenum as a horizontally-moving curtain of fluid.
41. The method of any of Claims 35 to 40, wherein the flow of fluid is substantially uniform from top to bottom across the array.

42. The method of any of Claims 35 to 41, wherein fluid recirculates in use within the cabinet.

5 43. The method of any of Claims 35 to 42, wherein the general flow of fluid is substantially horizontal throughout said recirculation.

44. A data centre installation comprising at least one cabinet as defined in any of Claims 1 to 34 or operating according to the method of any of Claims 35 to 43.

10 45. The installation of Claim 44, further including door interlock means preventing access to a cabinet if specified conditions are not met.

46. The installation of Claim 45, wherein a specified condition is user authority to access the cabinet.

15 47. The installation of Claim 45, wherein a specified condition is environmental compatibility inside and outside the cabinet.

20 48. The installation of Claim 45, wherein a specified condition is that an outer enclosure around the cabinet must be closed.

49. The installation of any of Claims 44 to 48, wherein an outer enclosure around the cabinet includes air conditioning means for controlling temperature and/or humidity

25 around the cabinet.

50. The installation of any of Claims 44 to 49, wherein the outer enclosure includes external panels spaced from walls of the enclosure.

30 51. A cabinet, a method of cooling an array of heat-producing units housed in a cabinet, or a data centre installation, substantially as hereinbefore described with reference to or as illustrated in any of the accompanying drawings apart from Figure 1.